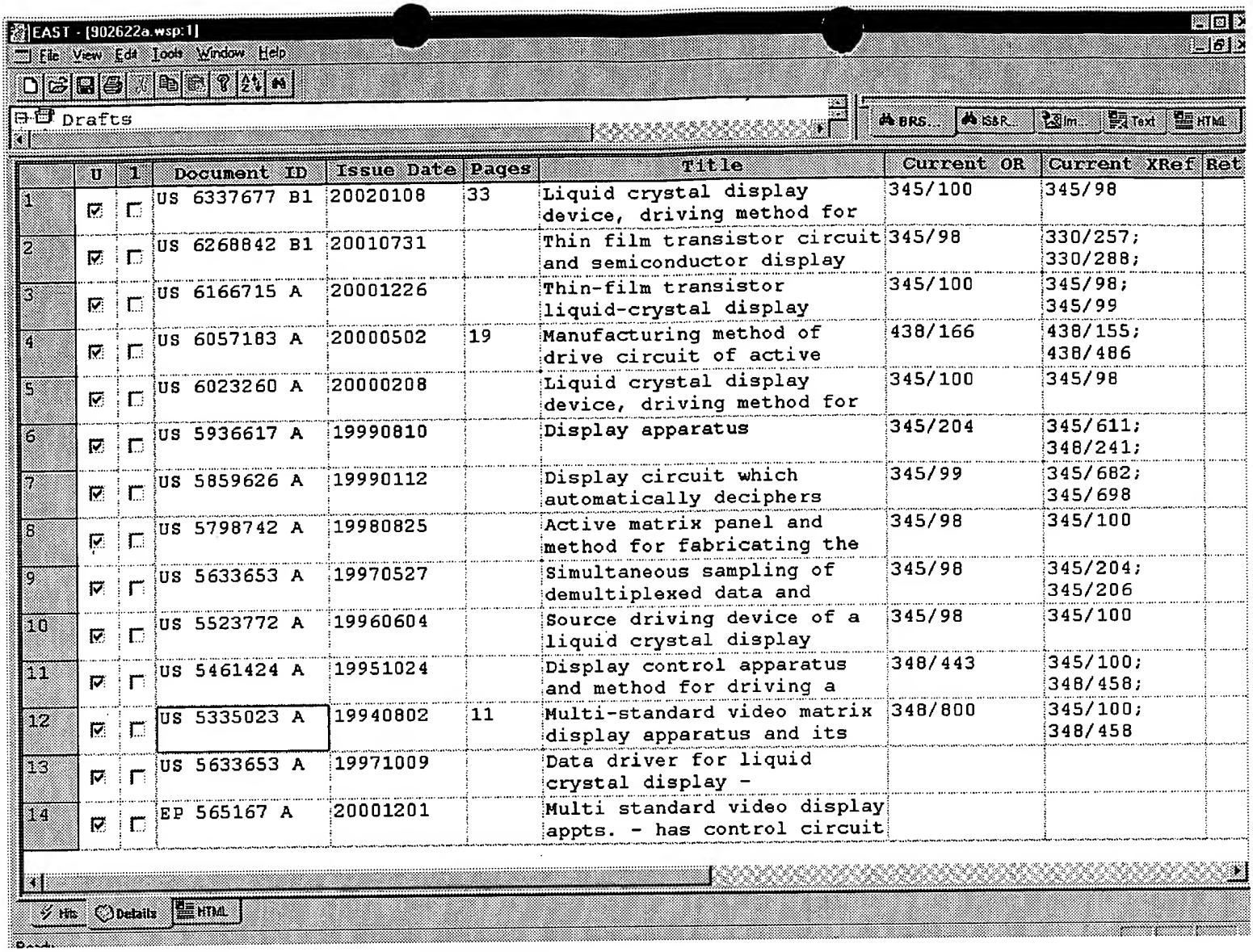
L Number	Hits	Search Text	DB	Time stamp
1	2327	345/100 or 345/98 or 345/92 or 345/93 or 345/205 or 345/206	USPAT; US-PGPUB	2002/02/21 19:12
4	255	source and drive and driver and buffer$ and laser and parallel and active adj matrix	USPAT; US-PGPUB	2002/02/21 19:21
7	10226	349/$.ccls.	USPAT; US-PGPUB	2002/02/21 19:20
10	54354	327/$.ccls.	USPAT; US-PGPUB	2002/02/21 19:20
13	198	source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)	USPAT; US-PGPUB	2002/02/21 19:23
16	190	source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate	USPAT; US-PGPUB	2002/02/21 19:25
19	42	source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate and stagger	USPAT; US-PGPUB	2002/02/21 19:28
25	1	source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate and stagger and ldd and analog adj buffer	USPAT; US-PGPUB	2002/02/21 19:31
22	23	source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate and stagger and ldd	USPAT; US-PGPUB	2002/02/21 21:06
28	0	327/$.ccls. and (source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$))	USPAT; US-PGPUB	2002/02/21 19:35
31	32	349/$.ccls. and (source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$))	USPAT; US-PGPUB	2002/02/21 19:36
40	2	349/$.ccls. and (source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate and stagger and ldd)	USPAT; US-PGPUB	2002/02/21 19:36
37	7	349/$.ccls. and (source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate and stagger)	USPAT; US-PGPUB	2002/02/21 19:51
34	32	349/$.ccls. and (source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate)	USPAT; US-PGPUB	2002/02/21 20:05
43	5	349/$.ccls. and (source and drive and driver and buffer$ and laser and parallel and active adj matrix and (tft or thin adj film adj2 transistor$)and gate) and oblique	USPAT; US-PGPUB	2002/02/21 20:05
46	3940	source adj follower$	USPAT; US-PGPUB	2002/02/21 21:07
49	298	analog adj buffer$	USPAT; US-PGPUB	2002/02/21 21:08
52	19	((source adj follower$) or (analog adj buffer$)) near parallel	USPAT; US-PGPUB	2002/02/21 21:09
55	3	((source adj follower$) or (analog adj buffer$)) near parallel and active adj matrix	USPAT; US-PGPUB	2002/02/21 21:09
-	367	345/629	USPAT; US-PGPUB	2001/08/31 12:34



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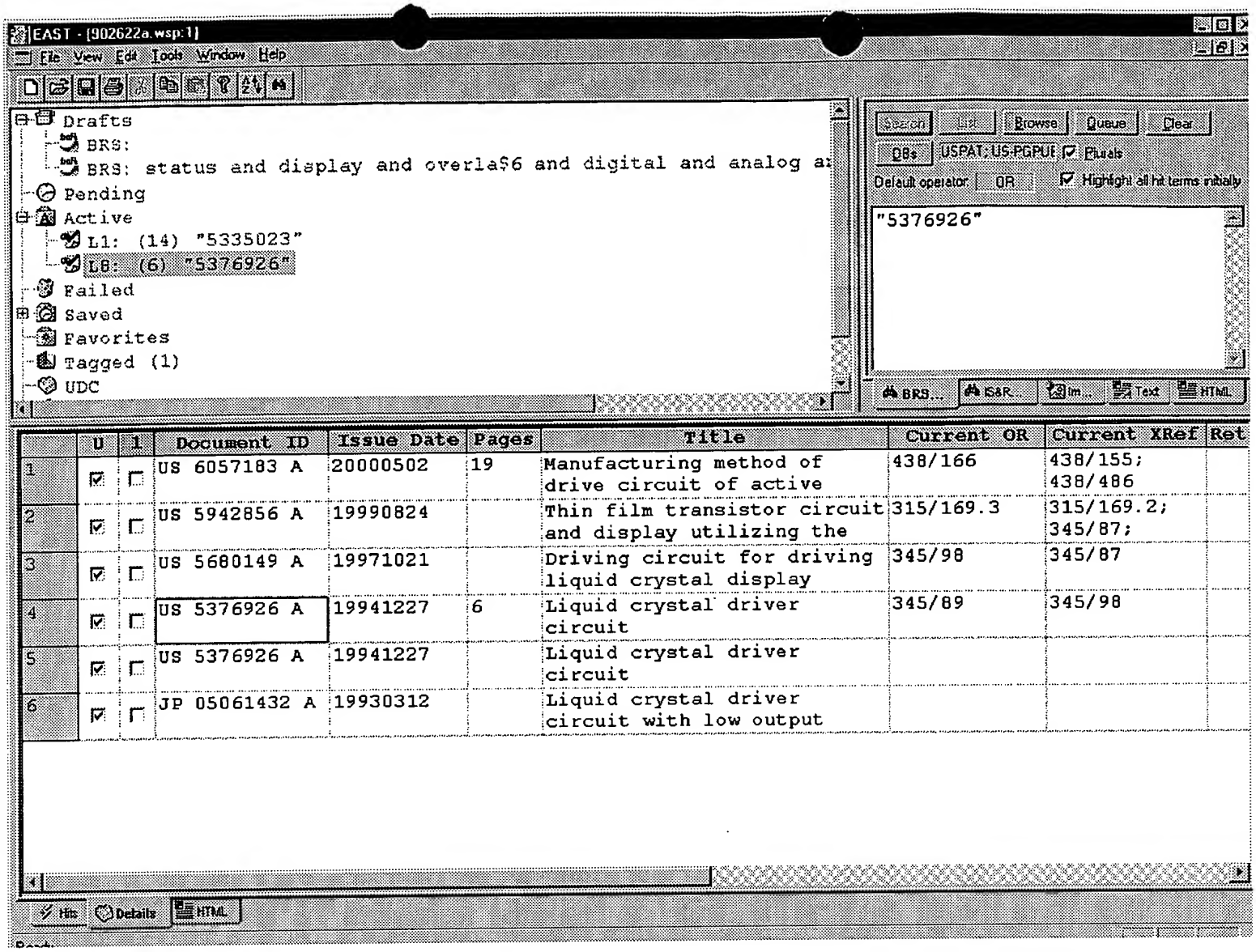
1	☑	☐	US 6337677 B1	20020108	33	Liquid crystal display device, driving method for	345/100	345/98	
2	☑	☐	US 6268842 B1	20010731		Thin film transistor circuit and semiconductor display	345/98	330/257; 330/288;	
3	☑	☐	US 6166715 A	20001226		Thin-film transistor liquid-crystal display	345/100	345/98; 345/99	
4	☑	☐	US 6057183 A	20000502	19	Manufacturing method of drive circuit of active	438/166	438/155; 438/486	
5	☑	☐	US 6023260 A	20000208		Liquid crystal display device, driving method for	345/100	345/98	
6	☑	☐	US 5936617 A	19990810		Display apparatus	345/204	345/611; 348/241;	
7	☑	☐	US 5859626 A	19990112		Display circuit which automatically deciphers	345/99	345/682; 345/698	
8	☑	☐	US 5798742 A	19980825		Active matrix panel and method for fabricating the	345/98	345/100	
9	☑	☐	US 5633653 A	19970527		Simultaneous sampling of demultiplexed data and	345/98	345/204; 345/206	
10	☑	☐	US 5523772 A	19960604		Source driving device of a liquid crystal display	345/98	345/100	
11	☑	☐	US 5461424 A	19951024		Display control apparatus and method for driving a	348/443	345/100; 348/458;	
12	☑	☐	US 5335023 A	19940802	11	Multi-standard video matrix display apparatus and its	348/800	345/100; 348/458	
13	☑	☐	US 5633653 A	19971009		Data driver for liquid crystal display -			
14	☑	☐	EP 565167 A	20001201		Multi standard video display appts. - has control circuit			



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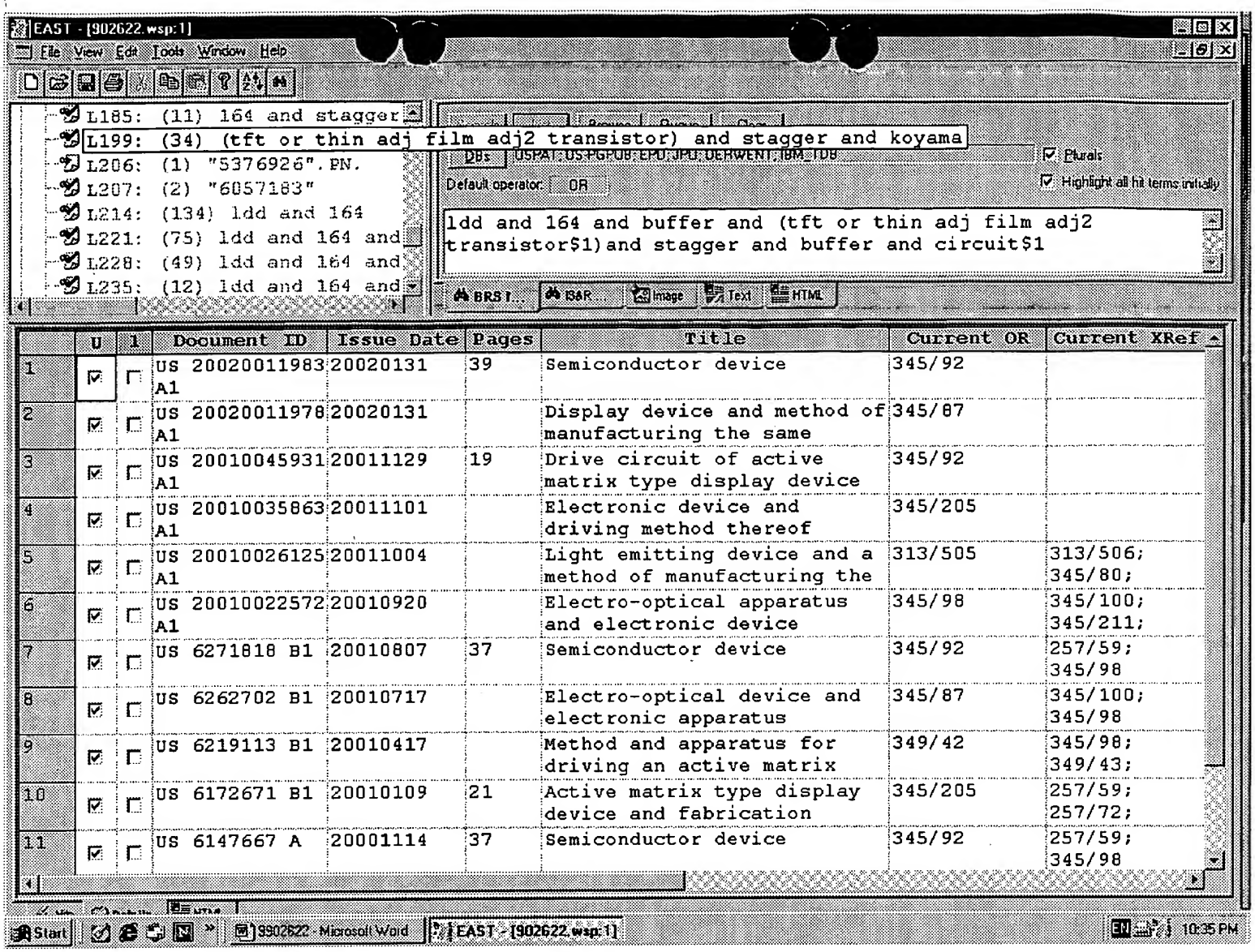
1	☑	☐	US 6057183 A	20000502	19	Manufacturing method of drive circuit of active	438/166	438/155; 438/486	
2	☑	☐	US 5942856 A	19990824		Thin film transistor circuit and display utilizing the	315/169.3	315/169.2; 345/87;	
3	☑	☐	US 5680149 A	19971021		Driving circuit for driving liquid crystal display	345/98	345/87	
4	☑	☐	US 5376926 A	19941227	6	Liquid crystal driver circuit	345/89	345/98	
5	☑	☐	US 5376926 A	19941227		Liquid crystal driver circuit			
6	☑	☐	JP 05061432 A	19930312		Liquid crystal driver circuit with low output			



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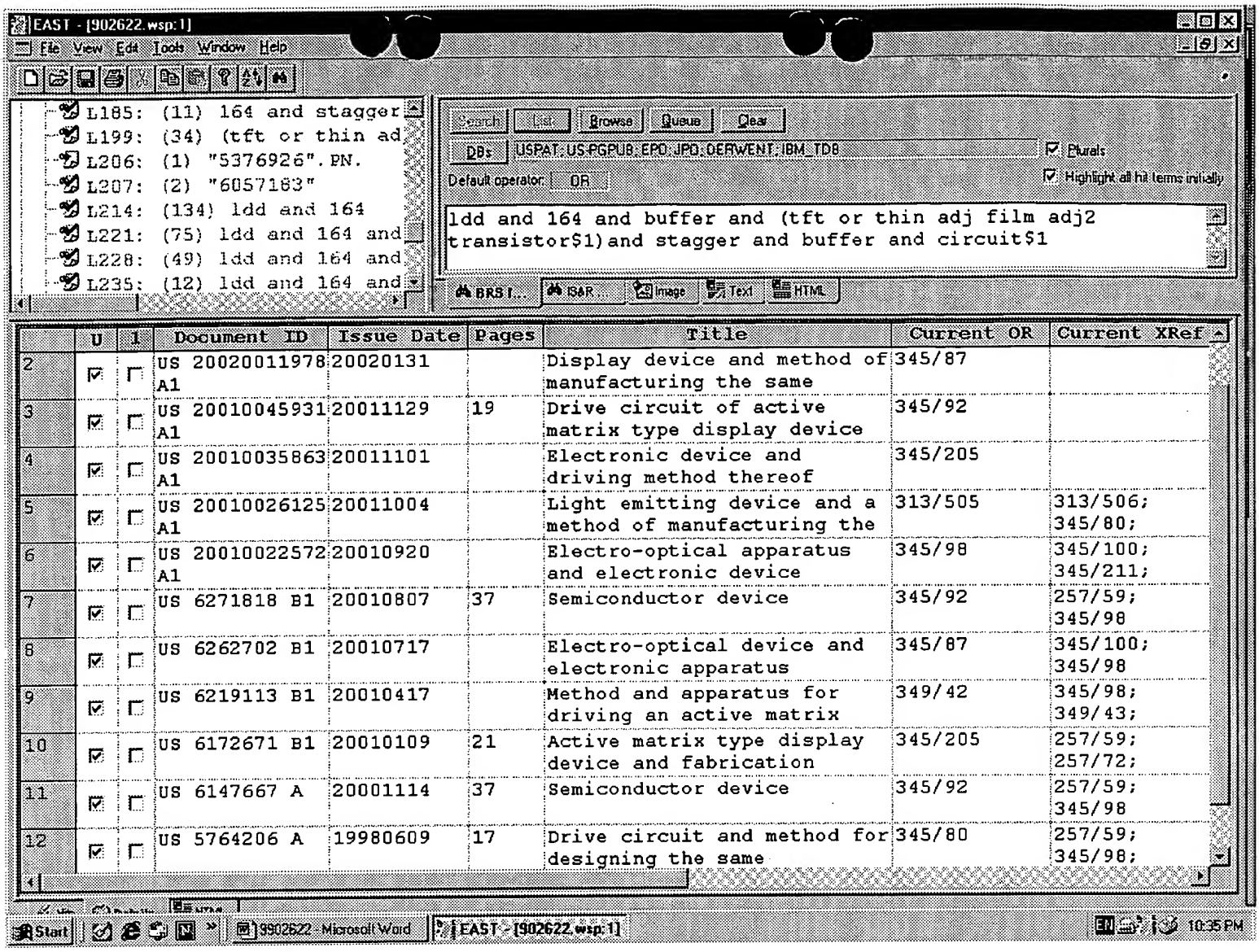
1	☑	☐	US 20020011983 A1	20020131	39	Semiconductor device	345/92	
2	☑	☐	US 20020011978 A1	20020131		Display device and method of manufacturing the same	345/87	
3	☑	☐	US 20010045931 A1	20011129	19	Drive circuit of active matrix type display device	345/92	
4	☑	☐	US 20010035863 A1	20011101		Electronic device and driving method thereof	345/205	
5	☑	☐	US 20010026125 A1	20011004		Light emitting device and a method of manufacturing the	313/505	313/506; 345/80;
6	☑	☐	US 20010022572 A1	20010920		Electro-optical apparatus and electronic device	345/98	345/100; 345/211;
7	☑	☐	US 6271818 B1	20010807	37	Semiconductor device	345/92	257/59; 345/98
8	☑	☐	US 6262702 B1	20010717		Electro-optical device and electronic apparatus	345/87	345/100; 345/98
9	☑	☐	US 6219113 B1	20010417		Method and apparatus for driving an active matrix	349/42	345/98; 349/43;
10	☑	☐	US 6172671 B1	20010109	21	Active matrix type display device and fabrication	345/205	257/59; 257/72;
11	☑	☐	US 6147667 A	20001114	37	Semiconductor device	345/92	257/59; 345/98



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2	☑	☐	US 20020011978 A1	20020131		Display device and method of manufacturing the same	345/87	
3	☑	☐	US 20010045931 A1	20011129	19	Drive circuit of active matrix type display device	345/92	
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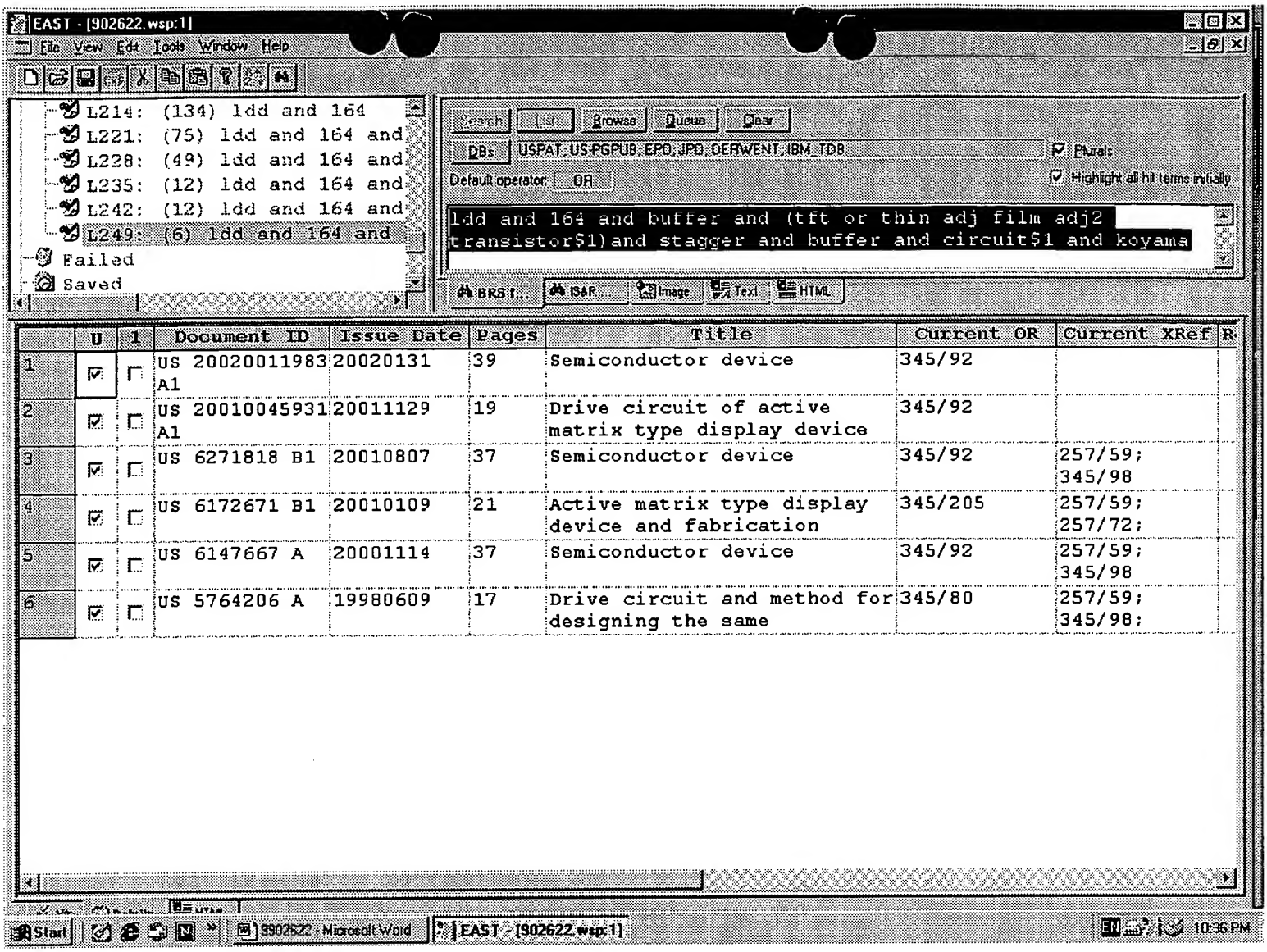
5	☑	☐	US 20010026125 A1	20011004		Light emitting device and a method of manufacturing the	313/505	313/506; 345/80;
6	☑	☐	US 20010022572 A1	20010920		Electro-optical apparatus and electronic device	345/98	345/100; 345/211;
7	☑	☐	US 6271818 B1	20010807	37	Semiconductor device	345/92	257/59; 345/98
8	☑	☐	US 6262702 B1	20010717		Electro-optical device and electronic apparatus	345/87	345/100; 345/98
9	☑	☐	US 6219113 B1	20010417		Method and apparatus for driving an active matrix	349/42	345/98; 349/43;
10	☑	☐	US 6172671 B1	20010109	21	Active matrix type display device and fabrication	345/205	257/59; 257/72;
11	☑	☐	US 6147667 A	20001114	37	Semiconductor device	345/92	257/59; 345/98
12	☑	☐	US 5764206 A	19980609	17	Drive circuit and method for designing the same	345/80	257/59; 345/98;



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1	☑	☐	US 20020011983 A1	20020131	39	Semiconductor device	345/92		
2	☑	☐	US 20010045931 A1	20011129	19	Drive circuit of active matrix type display device	345/92		
3	☑	☐	US 6271818 B1	20010807	37	Semiconductor device	345/92	257/59; 345/98	
4	☑	☐	US 6172671 B1	20010109	21	Active matrix type display device and fabrication	345/205	257/59; 257/72;	
5	☑	☐	US 6147667 A	20001114	37	Semiconductor device	345/92	257/59; 345/98	
6	☑	☐	US 5764206 A	19980609	17	Drive circuit and method for designing the same	345/80	257/59; 345/98;	

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DEPR:
FIG. 4 shows a fourth embodiment of the invention. In this embodiment, source followers are arranged at a pitch d, and the laser light illumination width L is equal to 4d. Two source followers that are located in an oblique direction are connected to each other in parallel.

DEPR:
FIG. 5 shows a fifth embodiment of the invention. In this embodiment, source followers are arranged at a pitch d, and the laser light illumination width L is equal to 4d. Three source followers located in an oblique direction are connected together in parallel.

CLPV:
wherein each of the buffer circuits is arranged obliquely with respect to said first direction so that a portion of at least one of the buffer circuits is positioned in the same line along said first direction as a portion of at least another one of the buffer circuits.

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US006057183A

United States Patent [19]
Koyama et al.

[11] Patent Number: 6,057,183
[45] Date of Patent: May 2, 2000

[54] MANUFACTURING METHOD OF DRIVE CIRCUIT OF ACTIVE MATRIX DEVICE

[75] Inventors: Jun Koyama; Yuji Kawasaki, both of Kanagawa, Japan

[73] Assignee: Semiconductor Energy Laboratory Co., Ltd., Kanagawa-ken, Japan

[21] Appl. No.: 08/974,102

[22] Filed: Nov. 19, 1997

Related U.S. Application Data

[63] Continuation of application No. 08/402,445, Apr. 13, 1995, abandoned.

[30] Foreign Application Priority Data

Apr. 22, 1994 [JP] Japan 6-107172

[51] Int. Cl.[7] H01L 21/84
[52] U.S. Cl. 438/149; 438/158; 438/486
[58] Field of Search 438/149, 158, 486; 257/72, 73

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FOREIGN PATENT DOCUMENTS

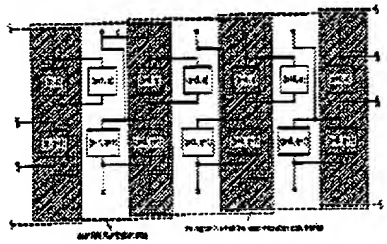
OTHER PUBLICATIONS

Primary Examiner—Charles Bowers
Assistant Examiner—Kevin Christianson
Attorney, Agent, or Firm—Nixon Peabody LLP; Costas A. Ferguson, III; Jeffrey L. Costellia

[57] ABSTRACT

A data holding control signal for each data line is supplied to a plurality of source followers that are connected together in parallel. The parallel-connected source followers are a combination of at least one first follower that is illuminated with laser light only once and at least one second follower that is illuminated twice. A width of the laser light illumination for equalization is equal to a pitch of the source followers multiplied by an integer that is not less than 3.

10 Claims, 11 Drawing Sheets



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(12) **United States Patent**
Takahara

(10) Patent No.: **US 6,219,113 B1**
(45) Date of Patent: **Apr. 17, 2001**

(54) METHOD AND APPARATUS FOR DRIVING AN ACTIVE MATRIX DISPLAY PANEL

(75) Inventor: Hiroshi Takahara, ...

(73) Assignee: Matsushita Electric Industrial Co., Ltd., Osaka (JP)

(22) Filed: Dec. ..., 1997

(30) Foreign Application Priority Data

(51) Int. Cl.

(52) U.S. Cl.

(58) Field of Search

(56) References Cited

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

OTHER PUBLICATIONS

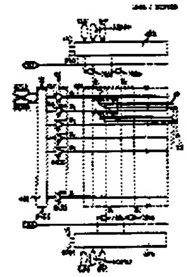
* cited by examiner

Primary Examiner—William ...
Assistant Examiner—... Chowdhury
(74) Attorney, Agent, or Firm—...

(57) ABSTRACT

An array substrate 12 is formed with pixel electrodes 14 in the form of a matrix. The pixel electrode 14 is connected to a thin film transistor ... A polymer dispersion liquid crystal layer ... is interposed between a counter electrode ... and the pixel electrodes 14. ...

... Claims, ... Drawing Sheets



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[0068] FIG. 4 shows a fourth embodiment of the invention. In this embodiment, source followers are arranged at a pitch d, and the laser light illumination width L is equal to 4d. Two source followers that are located in an oblique direction are connected to each other in parallel.

[0069] The laser light is first applied to source followers (p, q), (p+1, q), (p+2, q), (p+3, q), (p, q+1), (p+1, q+1), (p+2, q+1) and (p+3, q+1).

[0070] The laser light is then moved so as to illuminate source followers (p+3, q), (p+4, q), (p+5, q), (p+6, q), (p+3, q+1), (p+4, q+1), (p+5, q+1) and (p+6, q+1).

[0071] By connecting to each other in parallel the source followers (p, q) and (p+1, q+1), the source followers (p+1, q) and (p+2, q+1), the source followers (p+2, q) and (p+3, q+1), the source followers (p+3, q) and (p+4, q+1), the source followers (p+4, q) and (p+5, q+1), and the source followers (p+5, q) and (p+6, q+1) as shown in FIG. 4, the characteristics of the source followers are averaged, so that variations in the characteristics caused by the laser illumination can be reduced.

[0072] FIG. 5 shows a fifth embodiment of the invention. In this embodiment, source followers are arranged at a pitch d, and the laser light illumination width L is equal to 4d. Three source followers located in an oblique direction are connected together in parallel.

[0073] The laser light is first applied to source followers (p, q), (p+1, q), (p+2, q), (p+3, q), (p, q+1), (p+1, q+1), (p+2, q+1), (p+3, q+1), (p, q+2), (p+1, q+2), (p+2, q+2) and (p+3, q+2).

[0074] The laser light is then moved so as to illuminate source followers (p+3, q), (p+4, q), (p+5, q), (p+6, q), (p+3, q+1), (p+4, q+1), (p+5, q+1), (p+6, q+1), (p+3, q+2), (p+4, q+2), (p+5, q+2) and (p+6, q+2).

[0075] Since the source followers (p, q), (p, q+1), (p, q+2), (p+3, q), (p+3, q+1), (p+3, q+2), (p+6, q), (p+6, q+1) and (p+6, q+2) are illuminated twice with the laser light, they have the threshold voltage V.sub.thL (see FIG. 8).

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[0072] FIG. 5 shows a fifth embodiment of the invention. In this embodiment, source followers are arranged at a pitch d, and the laser light illumination width L is equal to 4d. Three source followers located in an oblique direction are connected together in parallel .

[0073] The laser light is first applied to source followers (p, q), (p+1, q), (p+2, q), (p+3, q), (p, q+1), (p+1, q+1), (p+2, q+1), (p+3, q+1), (p, q+2), (p+1, q+2), (p+2, q+2) and (p+3, q+2).

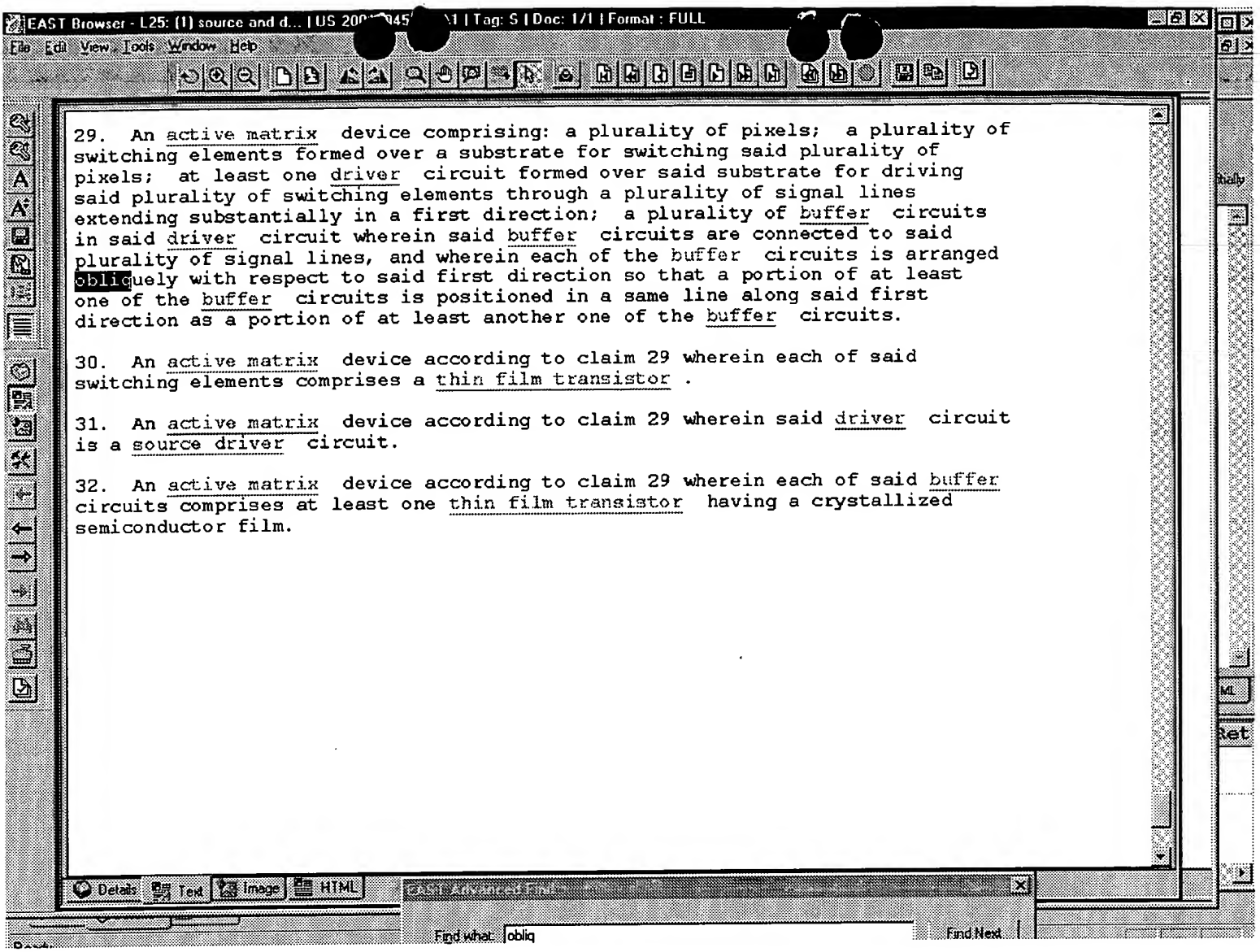
[0074] The laser light is then moved so as to illuminate source followers (p+3, q), (p+4, q), (p+5, q), (p+6, q), (p+3, q+1), (p+4, q+1), (p+5, q+1), (p+6, q+1), (p+3, q+2), (p+4, q+2), (p+5, q+2) and (p+6, q+2).

[0075] Since the source followers (p, q), (p, q+1), (p, q+2), (p+3, q), (p+3, q+1), (p+3, q+2), (p+6, q), (p+6, q+1) and (p+6, q+2) are illuminated twice with the laser light, they have the threshold voltage V.sub.thL (see FIG. 8).

[0076] Since the source followers (p+1, q), (p+2, q), (p+1, q+1), (p+2, q+1), (p+1, q+2), (p+2, q+2), (p+4, q), (p+5, q), (p+4, q+1), (p+5, q+1), (p+4, q+2) and (p+5, q+2) are illuminated only once with the laser light, they have the threshold voltage V.sub.thH (see FIG. 8).

[0077] By connecting together in parallel the source followers (p, q), (p+1, q+1) and (p+2, q+2), the source followers (p+1, q), (p+2, q+1) and (p+3, q+2), the source followers (p+2, q), (p+3, q+1) and (p+4, q+2), the source followers (p+3, q), (p+4, q+1) and (p+5, q+2), and the source followers (p+4, q), (p+5, q+1) and (p+6, q+2) as shown in FIG. 5, one of the three source followers of each combination is illuminated twice with the laser light and the other two source followers are illuminated only once. By combining the source followers in the above manner, the source followers of every set are made uniform, so that variations in the characteristics caused by the laser illumination can be eliminated.

[0078] As described above, by connecting in parallel the source followers that use thin-film transistors, the invention can suppress a variation of the threshold voltage V.sub.th due to overlapping of laser light illumination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29. An active matrix device comprising: a plurality of pixels; a plurality of switching elements formed over a substrate for switching said plurality of pixels; at least one driver circuit formed over said substrate for driving said plurality of switching elements through a plurality of signal lines extending substantially in a first direction; a plurality of buffer circuits in said driver circuit wherein said buffer circuits are connected to said plurality of signal lines, and wherein each of the buffer circuits is arranged obliquely with respect to said first direction so that a portion of at least one of the buffer circuits is positioned in a same line along said first direction as a portion of at least another one of the buffer circuits.
30. An active matrix device according to claim 29 wherein each of said switching elements comprises a thin film transistor .
31. An active matrix device according to claim 29 wherein said driver circuit is a source driver circuit.
32. An active matrix device according to claim 29 wherein each of said buffer circuits comprises at least one thin film transistor having a crystallized semiconductor film.
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